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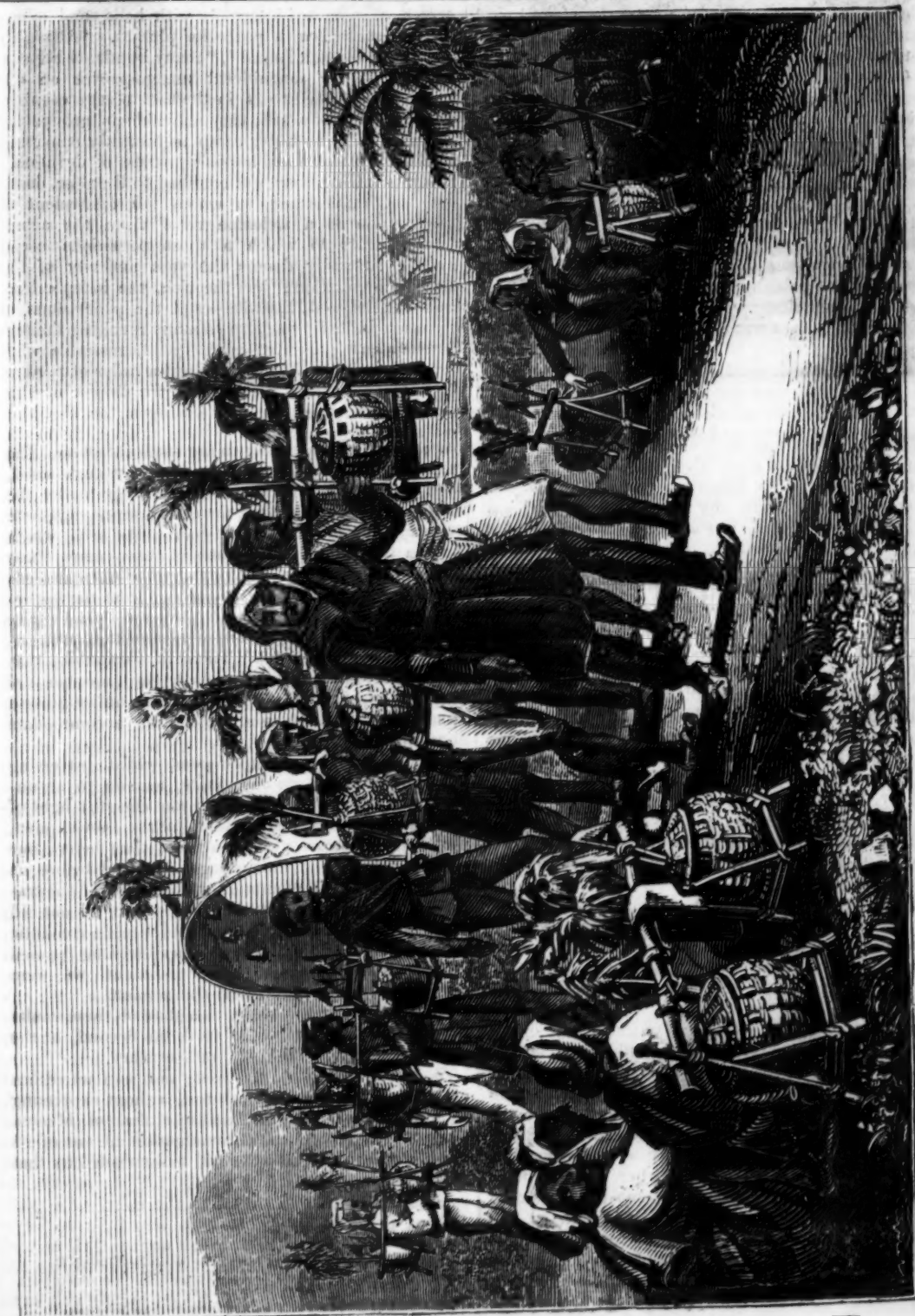
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HINDOO PILGRIMS.

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THERE is no country upon earth where pilgrims and devotees of every description abound so much as in Hindoostan. Will this be a matter of surprise, when it is known, that the gods of the Hindoo Pantheon amount in number to three hundred and thirty millions. Not a day passes in this "land of sunshine and of storm," but some festival is celebrated; and the entire lives of thousands of enthusiasts are passed in performing the revolting discipline of a devotion, which consists not only of numerous absurd and fantastic ceremonies, but frequently of the most profane and sanguinary rites.

Of the multitude of devotees and pilgrims in India, some idea may be formed, when it has been ascertained, that in the province of Bengal, alone, the number of mendicants—and mendicity is here a religious vocation—amounts to upwards of two millions. These persons are entirely supported by alms. Thus, supposing each person to obtain only a shilling per week, the gross sum would amount to more than five millions annually, and this, too, extracted, for the most part, from the small earnings of the labouring classes, of which poverty is at once the distinction and the heritage. The extent to which mendicity is carried, even among the Brahmins, in Bengal especially, is scarcely to be conceived; and the airs of authority which these sturdy beggars assume, are as arrogant as they are disgusting. Such is their ascendancy over the minds of the superstitious population, that they levy, as has been already shown, an enormous tax in this way, almost universally, and from that portion of the community which can with difficulty procure the common necessities of life.

Begging holds a conspicuous place among the religious obligations of the Hindoos; with some classes, it forms the main feature of their spiritual discipline; indeed, none of their sacred community can attain the supreme rank of spiritual distinction, except through this despicable occupation. The Yogues, so highly esteemed for their sanctity, are, universally, mendicants; and so complete is their influence over the vulgar, that these latter esteem it an enviable privilege to be permitted to administer to the necessities of those holy men. It is considered a positive degradation for a devotee of any repute to submit to the drudgery of an honest trade. Thus it happens, that these sacred persons are the most indolent, arrogant, and too often the most sensual wretches alive. It is impossible to help feeling that the mendicant fraternities, belonging to a branch of the Christian church, must have derived their origin from these Eastern idolaters. The coincidence is too strong to be accidental. The begging friars may certainly claim the sanction of heathen, though they cannot of apostolic antiquity.

During the cold season, pilgrimages from all parts, especially of Upper India, are performed to the Ganges. The roads on the banks of the river, at this period, are crowded with devotees, proceeding in large groups to the holy stream. They are usually well dressed, carrying on their shoulders a thick bamboo, from which, at either end, is suspended a frame, generally of coarse ratan-work, containing a spherical wicker-basket, covered, and filled with provisions and other necessities for the journey. Upon their return, globular jars of earthenware are placed within these baskets, and the sacred water of the Ganges is carried in them, frequently to the distance of many hundred miles, for the services of their temples. There is a pagoda on the island of Ramisseram, scarcely above a degree from the southern extremity of the Indian peninsula, in which no water is used but what is

brought from the Ganges. This is thrown over the idol every morning, and then sold at a great price to the devout who can afford to purchase so costly a blessing.

The persons who make their periodical pilgrimages to the holy river, generally form processions, exhibiting rather an agreeable scene to the traveller. They are attired in their newest garments; their baskets are adorned with feathers from the tail of the venerated peacock, and each party has one among them of superior dignity, who proceeds under an arched screen, ornamented internally with bells, and externally decorated with peacocks' plumes. "At night-fall," says Captain Luard*, "many hundreds bivouac together in the magnificent mango-groves on the road-side. After sunset, in the cool of the evening, at the ringing of a bell, they assemble in groups for prayers, and the noisy camp is instantly converted into a silent and most imposing scene of devotion." These pilgrimages are not confined to the poor, destitute and uninformed, to whom the excitement of superstition is a welcome relief from the actual bereavements to which a most pernicious social system so sadly dooms the vast majority of the Hindoo population; but the rich, the independent, and the learned, likewise swell the processions of devotion annually made to so many revolting shrines.

The men represented in the print, resemble what are called *Bangy Wallahs*, a superior order of porters, distinguished from the Coolies, the lowest of that class, by carrying their burdens upon the shoulder, while the latter always bear them upon their heads. So rigidly are these distinctive customs observed in India, that in many cases a Bangy Wallah would rather forfeit his life, than submit to the degradation of bearing, like the cooly, a load upon his head.

During their pilgrimages, the crowds, at particular places, are so great, that a year never passes without the sacrifice of a vast number of lives, and those who happen to be the victims upon these occasions, are considered fortunate in having obtained so holy a martyrdom. Although the Ganges is every where sacred, yet there are particular spots especially devoted to pilgrimages, and such are holy above all others. Hurdwar or Haridwar, as it is more properly designated, is the most venerated place in the estimation of all pious Hindoos. It is situated on the west side of the Ganges, where it issues into the plains of Hindoostan, from the northern hills. *Haridwar* signifies the Gate of God, the word *Hari* being an appellative applied to each of the three persons in the Hindoo triad, although more usually to Vishnu.

At some of these annual assemblies the crowd is prodigious. In 1796, it was said to amount to upwards of two millions and a half, although the place does not probably contain a thousand houses; but the great majority of visitors sleep in the open air, under the shelter of trees, or under rude tents, during the continuance of the concourse. At the festival in 1814, several hundred persons were crushed to death, owing to their impetuosity in a struggle for priority in taking the sacred bath. The street leading to the river was so narrow, and the rush so tremendous, that many were suffocated, and others trampled to death by the pressure of the crowd. Since this awful catastrophe, the passage, in which the principal mischief took place, has been enlarged by command of the British government, in order to facilitate the access to the river. An additional flight of steps has been also built, so as to obviate all likelihood of a similar accident. It created a great sensation at the time, among the superstitious

* In his *Series of Views in India*, to which beautiful work we are again indebted for our frontispiece.

devotees, who were unable to account for so severe a visitation: while some of the more fanatic among them looked upon it as an involuntary holocaust on the part of the sufferers, preordained by Siva himself, and likely to render him the more propitious towards those who had survived this wholesale destruction. During these annual meetings, the most deadly contests frequently take place between the votaries of Vishnu and Siva, and so sanguinary have these religious conflicts occasionally been, that, as I was assured by a Brahmin of Bengal, upwards of eight thousand persons were destroyed upon one occasion, somewhere I think about the latter end of the last century, within the short space of three days.

Benares*, or Casi the Splendid, is the next sacred spot. This celebrated city, is said, in the Brahminical traditions, to have been built of gold, but in consequence of the sins of the people, it became stone, and latterly, owing to their increasing wickedness, it has become clay. No earthquake is ever felt within its holy limits, and in consequence of its peculiar position, it escaped destruction during a partial overwhelming of the world. With such a high character for sanctity, it is no wonder that Benares is a favourite place of resort for devout worshippers, and half-crazed enthusiasts. The whole face of the city which lines the bank of the river, is one continued series of ghauts, for the accommodation of Pilgrims.

Allahabad is another sacred place. "Here, when a pilgrim arrives," says Hamilton, "he first sits down on the brink of the river, and has his head and body shaved, so that each hair may fall into the water, the sacred writings promising him one million of years' residence in heaven for every hair thus deposited. After shaving, he bathes, and the same day, or the next, performs the obsequies of his deceased ancestors."

The most celebrated place for pilgrimages in India, is the Temple of Jagganath, in the Province of Orissa, of which a detailed account was given in the first Volume of the *Saturday Magazine*. It is difficult to ascertain the number of victims yearly sacrificed under the wheels of the ponderous car which bears the Idol of Jagganath, but they are some years said to exceed two thousand, though this is not, I believe, common. Numbers of pilgrims perish on the road to this sanguinary shrine, and their bodies generally remain unburied. "On a plain by the river," says Buchanan, "near the pilgrims' caravansera at this place, there are more than a hundred skulls. The dogs, jackals, and vultures seem to live on human prey." Nothing can exceed the disgusting Saturnalia here witnessed during the procession of the sacred car. It is truly horrible to behold those immolations of which Southey has given so just a picture in his immortal poem, *The Curse of Kehama*.

A thousand pilgrims strain
Arm, shoulder, breast, and thigh, with might and main,
To drag that sacred wain,
And scarce can draw along the enormous load.
Prono fall the frantic votaries in its road,
And calling on the God,
Their self-devoted bodies there they lay
To pave his chariot-way.
On Jagganath they call—
The ponderous car rolls on and crushes all.
Through blood and bones it ploughs its dreadful path,
Groans rise unheard; the dying cry,
And death and agony
Are trodden under foot by that mad throng,
Who follow close and thrust the deadly wheels along.

The places visited by pilgrims in India, are almost innumerable; but those which I have mentioned are among the most celebrated.

J. H. O.

COMPARISON OF MEN WITH ANIMALS.

Of all the species of animals which exist on the surface of the earth, man alone exhibits an excessive disparity in his attainments at remote periods of his history. In animals, each individual attains the complete use of all its faculties; and this, even though successive generations of the tribe be separated from each other by a long lapse of time. With many animals, nothing in the shape of instruction is needed. The insect-tribes at once proceed in the course that nature has designed for them. No sooner does the egg burst, than the larva sets itself about the business of its existence; it swims expertly through the water, and seeks out its appropriate food. Led by an unerring instinct, it approaches the surface of the pool, or climbs the stalk of some aquatic plant, and ere the spectator has time to mark the change, it launches off into an untried element, and is undistinguished amid the thousands that have had the long experience of an hour. Some again wake to life in the tough bark, and eat their vermicular way through the sap-wood; till when the metamorphosis draws near, they suck the outer-rind, cut it with their mandibles, elevate their elytra, unfold from beneath their delicate wings, and use with the utmost ease their newly-acquired powers and senses.

Ascending (as it is termed) the scale of existence, we find the elements of tuition begin to appear. The birds, for the most part, educate their young; they lead them by short flights to seek their food, and only abandon them after their powers are fully developed. The same remark holds good of many of the quadrupeds. In all cases, however, the powers arrived at are nearly the same, with each individual of a species. But when we reach the top of the scale, how different! The young of the human species receives not merely that tuition which is common to all mammalia, but also a distinct kind of education, which conveys the fruits of the experience of all the preceding generations. Man lives to add to that experience, and though his physical powers reach to their full development, the entire man knows nothing of maturity. Powers of which our ancestors were ignorant, are now wielded by us, while we, in our turn, are opening the way for other and more transcendent powers to be employed by our descendants.

The burrowing bee still uses the same instrument to pierce the downright shaft, and to cluster round it the beautifully smoothed cells. Still she selects the hard-beaten soil, whence the wind may sweep the dust that otherwise would betray her labours. The sand-spider still uses the same cement to form the walls of her retreat, and to weave her branchy net. But man is found at one time burying himself in the ground, at another tearing the rocks asunder to rear magnificent palaces. Here he draws his sustenance from the ocean, there he cultivates the ground; here he clothes himself in the skin of the wild beast, there he wears the delicate web, and prides himself in the splendour of his apparel. With man there is no permanence; every thing is changing, and each season adds to his powers and comfort. He seems to possess an endless variety of appetites, that are only called into action as opportunity offers for their gratification; there lurks within him an immense variety of powers, of which only a few are called into active use by any individual.

Among animals the history of an individual is almost the history of the race; but the story of the life of man is ever changing; and the mode of living of one nation appears incredible to another. Man is possessed of a highly muscular and pliable form,

* See *Saturday Magazine*, Vol. V., p. 194.

capable of enduring long and vigorous exertion; the tenderness of his limbs prohibits the direct employment of his powers. The animals are invariably supplied with instruments fit for the various operations they have to perform. The bee has the proboscis to reach the nectary; the burrowing animals have claws for digging the earth, and the beasts of prey for tearing their food. But man works by tools. The capability of employing inanimate matter, of making it, at it were, a part of himself, is peculiar to man; only faint traces of that power are to be perceived among the animal tribes. In man it is completely developed; for, on reflection, we at once perceive that almost every operation which we perform, is done by the assistance of tools of one kind or another.

[Edinburgh Philosophical Journal.]

THE WATER OF THE NILE.

THE water of Egypt, (says the Abbé Mascrier,) is so delicious, that one would not wish the heat should be less, nor to be delivered from the sensation of thirst. The Turks find it so exquisitely charming that they excite themselves to drink of it by eating salt. It is a common saying among them, that if Mohammed had drunk of it, he would have begged God not to have died, that he might always have done it. When the Egyptians undertake the pilgrimage of Mecca, or go out of their country on any other account, they speak of nothing but the pleasure they shall find at their return, in drinking the Nile water. There is nothing to be compared to this satisfaction; it surpasses in their esteem that of seeing their relations again, and their families. All those who have tasted this water, allow that they never met with the like in any other place. When a person drinks of it for the first time, it seems difficult to believe that it is not a water prepared by art. It has something in it so inexpressibly agreeable and pleasing to the taste, that it deserves that rank among waters that Champagne has among wines. But its most valuable quality is that it is exceedingly salutary. It never incommodes, let it be drunk in what quantity it may; this is so true that it is no uncommon thing to see some persons drink three buckets of it in a day, without inconvenience!

It is right to observe that the water of the Nile is that which is alone intended in these high encomiums. Well-water in Egypt is detestable and unwholesome. Fountains are so rare that they are a kind of prodigy in that country. Rain-water it would be vain to attempt preserving, as scarcely any falls in Egypt.

How peculiarly forcible and expressive are the words of Moses to Pharaoh. "The Egyptians shall lothe to drink of the water of the river." That water in which they so much delighted,—that which they preferred to all other water in the world, and to which they had been so long accustomed, should become so hateful, that they would turn away from it in disdain, and instead of it drink well-water, which, in their country, is, of all other kinds of water, the most detestable!

O. N.

[HARMER'S Observations.]

THERE is this advantage in the pursuit of science, that it tends to generate liberality of sentiment, and destroy those prejudices which divide nations far more effectually than any barrier of nature. Science is of no country, and its followers, wherever born, constitute a wide and diffusive community, and are linked together by ties of brotherhood and interest, which political hostility cannot sever.—T. H.

As surely as God is good, so surely there is no such thing as necessary evil. For by the religious mind, sickness, and pain, and death, are not to be accounted evils. Moral evils are of your own making; and undoubtedly, the greater part of them may be prevented. Deformities of mind, as of body, will sometimes occur. Some voluntary cast-aways there will always be, whom no fostering kindness and no parental care can preserve from self-destruction; but if any are lost for want of care and culture, there is a sin of omission in the society to which they belong.—SOUTHEY.

THE BEE AND THE THISTLE-DOWN. A FABLE.

I ENVY not the man who draws
His bliss from *Popular Applause*,
E'en when I see such Fortune shed
Her gaudiest honours on his head.
And why? She's but a treach'rous thing,
Ready to spread her recreant wing,
And steal the peace she cannot bring.

"What, then," you cry, "is man to close
His ears against the praise of those
Whose welfare (in the gen'ral weal)
Thrives by his efforts; and to steel
His heart against a grateful cheer?"
No! But I'll make my meaning clear.

'Tis one thing for a being form'd
For worthy fame, by glory warm'd,
Encouraged in his course, to feel
The joy that springs from prosperous zeal,
And to peruse, with meek surprise,
"His HIST'RY IN A NATION'S EYES."
He values, though he will not court,
The treasure of a good report;
He spurns not, with a brow austere,
The meed bestowed on toils severe,
But further looks, and cannot live
In the false air mere honours give.

'Tis one thing, seeing round us rise
Flow'rs that make earth a paradise,
And which the humble in their sphere
Who little think it, yet may rear:
For a good name, wherever found,
Is sweet as flow'rs from fertile ground.

But 'tis another to depend
On ev'ry breath caprice may lend;
And never feeling high enough,
Look down with thanks on fools who puff:
Such posture augurs shame and ill,
'Tis a foul medium, and must kill.
So have I seen an empty ball
Go bounding up—and in its fall,
Catch kicks and buffets from a crew
Of hooting boys who still pursue.

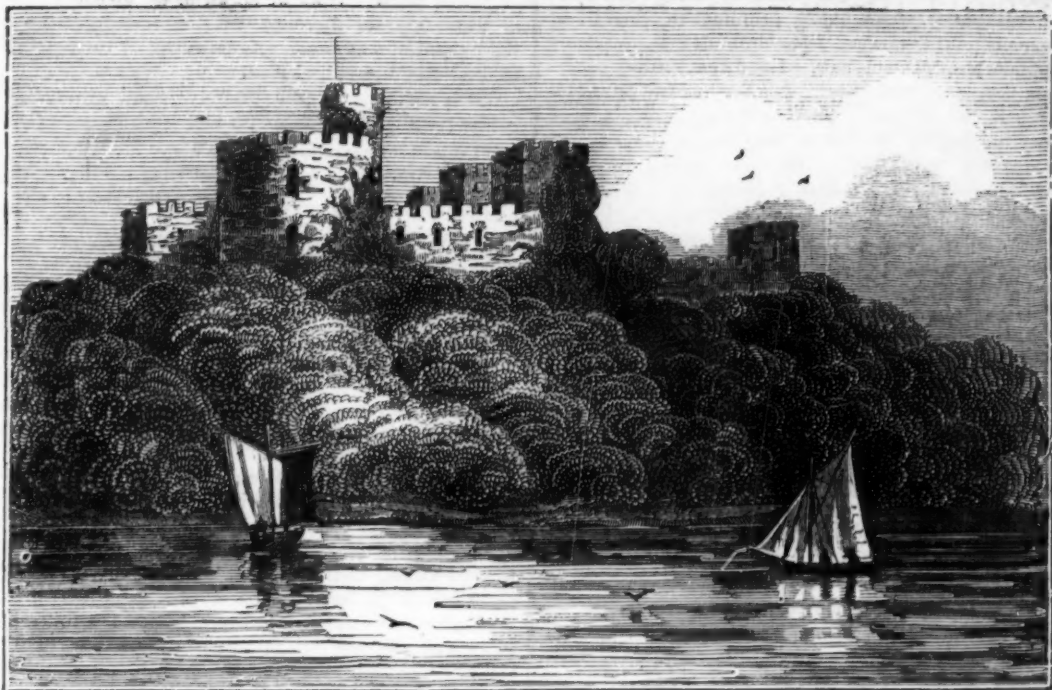
Now to the heroes of my lay:
It chanced, one bright but windy day,
A working BEE, by toil oppress'd
Hard by a thistle stopp'd to rest;
And there in all its silken pride
A restless THISTLE-DOWN espied
On tiptoe, as the breeze came on,
To catch the current and be gone!
Stretched were its arms, like finest thread,
Yet, ere it vanish'd over head,
"One moment," cried the Bee, "attend;
And take the counsel of a friend.
In this design, whate'er you do,
Just think what you are trusting to.
The smile may soon become a frown!
The gale that lifts will cast you down!
Then mark me, vain one, thou'lt repine
The more because the fault was thine.

"The good ship vent'ring on the main,
Has means to bring her home again,
But without anchor, ballast, helm,
Must not the winds and waves o'erwhelm?
The bird, when angry storms prevail,
Can poise his weight against the gale;
And e'en the kite, a childish thing,
Has got a tail, and lengthened string;
But thou, endowed like none of these,
Wilt rise and perish with the breeze!"

And so it was;—for borne away,
In attitudes that seem'd to say,
How glorious! Am I not as one
At least first-cousin to the Sun?
Wild THISTLE-DOWN got out of sight:
But the wind hurl'd him from his height.
Spoil'd, drench'd, and draggled, down he reel'd,
Where slimy pools defiled the field,
And there he stuck, and will remain
A lesson for the towering brain,
Till future seasons shall be found
To bring another instance round.

M.

THE ISLE OF WIGHT.



No. V. NORRIS CASTLE.

HEAVEN, from thy endless goodness, send long life,
And ever happy, to the high and mighty
Princess of England!—*Henry VIII.*

THERE is certainly no part of England which presents, within so limited a space, such a vast variety of attractions as the Isle of Wight. The peculiarly healthy character of its climate, the singular beauty of its varied scenery, as well as the great facilities here afforded for the enjoyment of the sea, are amongst the causes which bring together, year after year, crowds of visitors to its shores. We cannot then wonder that this highly-favoured spot should have been more than once selected for the temporary sojourn of that youthful Princess,

The dews of heaven fall thick in blessings on her!

to whom we necessarily look, in God's own good time, (may it be long before it come,) to watch over, and, as far as it is permitted to mortals, to direct the destinies of our beloved native country.

Nor could, perhaps, a more suitable mansion have been found in the island for the royal residence than that of which we give above a very faithful representation, from a drawing made of it in 1830. And sure we are, that, independent of any other claims which Norris Castle may have to our notice, either from the natural beauties of its situation, or the picturesque character of the building, the honour thus conferred on this noble edifice, cannot fail to invest it with a no common degree of interest.

This Castle occupies a most beautiful part of the woodland tract, which extends on the northern side of the island, along the shores of the Solent Sea from East Cowes to St. Helen's. It was originally built by Lord Henry Seymour, from the designs of Mr. Wyatt, and professing to be in imitation of an ancient castle of the Norman style, is of no small dimensions. Its favourable position has been thus admirably described by Sir H. Englefield.

"Seated on the steep descent of the coast to the Solent Sea, it perhaps commands a view of that strait, superior in beauty to any other point in the

island. To the east, Portsmouth, crowded with shipping, is in full view, and the richest line of the woody coast of the island from Barton to Nettlestone, appears in long and varied perspective. To the north, the Southampton river is seen in its whole extent, and the town of Southampton, with its spires and towers, though at more than ten miles' distance, is no inconsiderable object. The woods of the New Forest, clothe the view to the west; while Calshot Castle, on the point of its long bank of shingle, stands boldly out amidst the waves, and marks the separation between the Solent sea and Southampton river. The house is of a very noble general form, and its clustering towers, in every point of view, particularly when seen from the sea, are a striking and commanding object, and a most splendid addition to the general scenery of the coast. The choice of both the form and site of the mansion, reflects the highest honour on the taste of the noble owner."

Few persons, upon viewing the Castle from a little distance, would imagine it to be a mere modern production; for the massive towers by which it is surmounted, rising as they do from amongst the mantling woods which surround it, present to the eye a semblance of the utmost grandeur and strength; and whilst the materials of which the edifice was constructed, were themselves so prepared as to possess a prematurely weather-stained appearance, the extraordinarily rapid growth of the ivy that envelops some even of its loftiest portions, serves still more, perhaps, to impress the whole with an air of the most venerable antiquity.

In the interior, there is little to be seen, but the arrangement of the apartments is considered to be admirable. Over a door in the passage, is the history of the Seymour family, in Heraldry. One of the symbols represents the marriage of Henry the Eighth, with Lady Jane Seymour, from whom Lord Seymour was descended. The grounds, which are beautifully varied by gentle rise and fall, are all laid out; and most interesting views of the sea and surrounding country, present themselves in every direction amongst the trees.

D. I. E.

FAMILIAR ILLUSTRATIONS OF EXPERIMENTAL SCIENCE.

No. VII. HEAT. LIQUEFACTION.

AMONG the vast variety of substances with which we are acquainted, and under whatever forms they may present themselves to our notice, it is not strictly correct to say of any one substance, that it is in its *natural* state. What we are accustomed to consider as the most natural state or form of bodies, whether it be solid, or liquid, or æriform, is that in which we most commonly observe them, and in which they prove to us the most useful.

The presence or absence of heat determines the form, and increases or diminishes the usefulness of all terrestrial objects. By the addition of heat solid bodies become liquid, and liquid bodies become æriform. By the abstraction of heat æriform bodies are rendered liquid, and those bodies which we are accustomed to view only as liquids become solid. The forms and conditions of bodies are dependent, therefore, not simply upon any properties, or habits, peculiar to the elements of which any particular substance may be composed, but also upon the precise quantity of heat with which those elements may, either permanently or temporarily, be associated.

In the operations of the Divine hand there is no waste, either of power or of materials. We have already shown* that matter may be so minutely divided, so extensively diffused, and so completely changed in appearance, as to elude the most vigilant search by our ordinary perceptions, but yet not a particle is ever destroyed. This is equally true, as it respects that refined class of elements to which heat belongs, and among which it occupies so important a station. If it be necessary to separate from an æriform body a great portion of the heat that has been combined with it, before we can make it assume the liquid form; and, in like manner, if we must, of necessity, disengage from a liquid body a certain quantity of heat before it will become solid, in both these cases the heat can be separated only on the express condition of our causing, or permitting, it to enter into some other substance. We may be instrumental in producing a change of place, but we have no power to work any other change. Thus, amidst unceasing revolutions, and to the unpractised eye, apparent dilapidation and confusion, proceeds, throughout the whole domain of nature, order, and strength, and beauty.

Almost the whole of those bodies which we denominate liquids, may be rendered solid. There are only two or three exceptions, the most important of which is alcohol; and it is believed, that this could be frozen, if we knew how to produce a greater degree of cold than has been hitherto obtained. All solid bodies may be changed by heat, either to a liquid or æriform state. The most refractory substances, as limestone, chalk, and porcelain, are capable of fusion, whilst the diamond, which is usually considered the hardest of all substances, enters into vivid combustion at a comparatively moderate temperature, thence constituting one of the elements of a gaseous body.

The particular temperature at which liquid bodies, under ordinary circumstances, become solid, is termed the *freezing* point, and sometimes the point of congelation. The particular temperature at which solid bodies become fluid† is described as the *melting*,

or fusing point. Thus we speak of the freezing-point of water and of mercury, of the melting-point of tallow and of wax, and of the melting or fusing point of lead, tin, brass, and iron.

Each particular liquid becomes solid at a temperature peculiar to itself;—for example,—

Olive Oil becomes solid at	36°	Sea-Water	27½
Water	32	Wine	20
Milk	30	Oil of Turpentine	14
Vinegar	28	Brine (salt one part, water four parts)	7

There are many other liquids used in various arts, in medicine, and in chemical experiments, which require a still greater degree of cold to effect their congelation; of these one of the most useful, and, at the same time, one that is commonly known, is mercury, (quicksilver,) which, although it retains its fluidity in the severest weather ever experienced in this country, in the more northern parts of Europe will become solid, and may be beaten into thin plates like tin. The temperature at which mercury freezes is 39° below 0° (zero), that is, 71° below the freezing-point of water.

The melting-point of solid bodies is constant. By this we mean, that each particular body invariably passes from the solid to the fluid state, when it has attained a certain specific temperature. The following table exhibits the melting-points of a few of the solid bodies with which we are most familiar.

Tallow melts when heated to	92°	Zinc	648°
Bees' wax (bleached)	142	Brass	1669
Sulphur	218	Silver	2233
Tin	442	Copper	2548
Lead	606	Gold	2590
		Cast iron	3479

A thermometer‡ supplies us with the means of estimating comparative degrees of temperature, simply by the expansibility of the fluid contained in its tube. If the body with which we place a thermometer in contact, is warmer than the tube, heat is imparted to it, and the contained fluid expands; if, on the contrary, the body in contact is colder than the thermometer-tube, heat passes from the contained fluid, and it contracts.

When thermometers are intended to indicate very low degrees of temperature, alcohol (spirits of wine) tinged with some kind of colouring-matter is usually employed. The propriety of this will appear, when we take into account the great degree of cold that alcohol will sustain without becoming solid. It has been exposed to a temperature equal to 132° below the freezing-point of water, without undergoing any other change than a diminution of its bulk. For all ordinary purposes, and especially for high degrees of temperature, mercury is better adapted than any other fluid for thermometers. It expands more uniformly than water or alcohol, whilst its boiling-point (668°) is much higher than any other body that remains fluid at the ordinary temperature of the atmosphere. For estimating the sensible heat of bodies above the temperature of boiling mercury the common thermometer is not available. This difficult process is usually performed by noting the expansion of a certain quantity of air, or, as it is supposed, with greater accuracy, by measuring the expansion of a bar of platinum.

There is this remarkable distinction between expansion and liquefaction. The former takes place at every successive addition of heat made to a body in its transition from the state of a solid to that of a fluid. Liquefaction depends solely on a solid body being heated to a particular temperature.

The quantity of heat imparted to a body is not

* See *Saturday Magazine*, Vol. V., p. 13.

† Fluid and liquid may be considered as synonymous terms when a liquid body is described. Thus water is a fluid, and it is also a liquid. Æriform bodies are termed fluids, but it would, of course be improper to call them liquids.

‡ See *Saturday Magazine*, Vol. IV., p. 11.

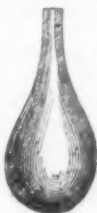
the only condition essential to its fluidity: it is necessary that a certain quantity should be accumulated within it at the same instant of time.

To this property of matter we are indebted for the durability and usefulness of our metallic culinary vessels. Whilst they contain water there is no danger of their being melted; but when this precaution is neglected, and copper or tin vessels are exposed to the action of the fire, the solder by which their joints are united speedily melts, and the vessels become leaky, and perhaps fall to pieces.

The freezing-point of liquids, and the melting-point of solids, is materially affected by the admixture of two or more bodies of different kinds. Thus water, which usually becomes ice at 32° , may, by the addition of one part of common salt to three parts of water, be cooled down to 4° before it will show any symptoms of congelation. By a particular process it is possible to reduce the temperature of water, of solutions of crystallizable salts, and even of metals, below their ordinary points of congelation, and without producing that result. It appears, that whilst motion among the particles of bodies is one preparatory condition to a change of form, something more than motion is, under particular circumstances, required. We will endeavour to illustrate this by an example.

Having provided a glass vessel, with a long narrow neck, as denoted in the annexed figure, say, for instance, a Florence oil-flask, we should nearly fill it with boiling water, in which has been previously dissolved as great a quantity as possible of sulphate of soda* (Glauber salts), and then tie securely over the mouth of the flask, two or three folds of moistened bladder, so as effectually to exclude the air. The height at which the liquid stands in the neck of the vessel should be denoted by a mark upon the glass, or it may be done more easily, by tying round it a piece of thread. Matters being thus arranged, the liquid should be permitted to cool down to the temperature of the surrounding air. When that is accomplished, it will be seen that the surface of the liquid has descended in the neck of the flask, denoting a diminution of its bulk. If we now ascertain as accurately as possible, by the hand, the comparative temperature of the flask, at the same time suddenly piercing the bladder, so as to admit the external air, it is probable that crystallization will instantly commence at the surface of the liquid, proceeding rapidly downwards, until the whole has become solid. By keeping the hand upon the flask, we shall perceive a very considerable increase of temperature; and by noting the mark upon its neck, we shall also find there has been an augmentation of bulk. Should it happen that crystallization does not commence on the admission of air, the object may generally be attained by slightly agitating the liquid. If that process be ineffectual, which is not very probable, a small stone, a piece of metal, or a single grain of any kind of salt, dropped into the flask, will immediately produce the desired result. To render this experiment the more interesting, we recommend the employment of two glass vessels, both of which should be filled with the solution; but whilst one is subjected to the treatment just described, the other should be left open to the influence of the atmosphere.

Flasks, as indicated by the figure, are the most convenient vessels for containing hot liquids in



chemical experiments, because they are not so liable to be fractured, as more irregularly-formed vessels; but they are not absolutely necessary. When this, or any other particular form of apparatus, cannot be easily obtained, common phial-bottles may, with proper care, be made to supply their place.

Pure water, by a process somewhat similar to that we have explained, may be made to preserve its fluidity at a temperature equal to 27° below its ordinary freezing-point (32° .) It is deserving of remark, however, of water under these circumstances, that the instant it begins to freeze, its temperature rises from 5° to 32° , where it remains fixed, until the whole of the water has become solid. The ordinary melting-point of tin, is 442° but it may, notwithstanding, be cooled, by skilful management, to 438° , without solidifying. When it begins to assume the solid form, its temperature rises to 442° . Hence we learn, that the loss of sensible heat is not the sole cause of fluid bodies becoming solid; and that its addition is not all that is necessary to render a solid body fluid.

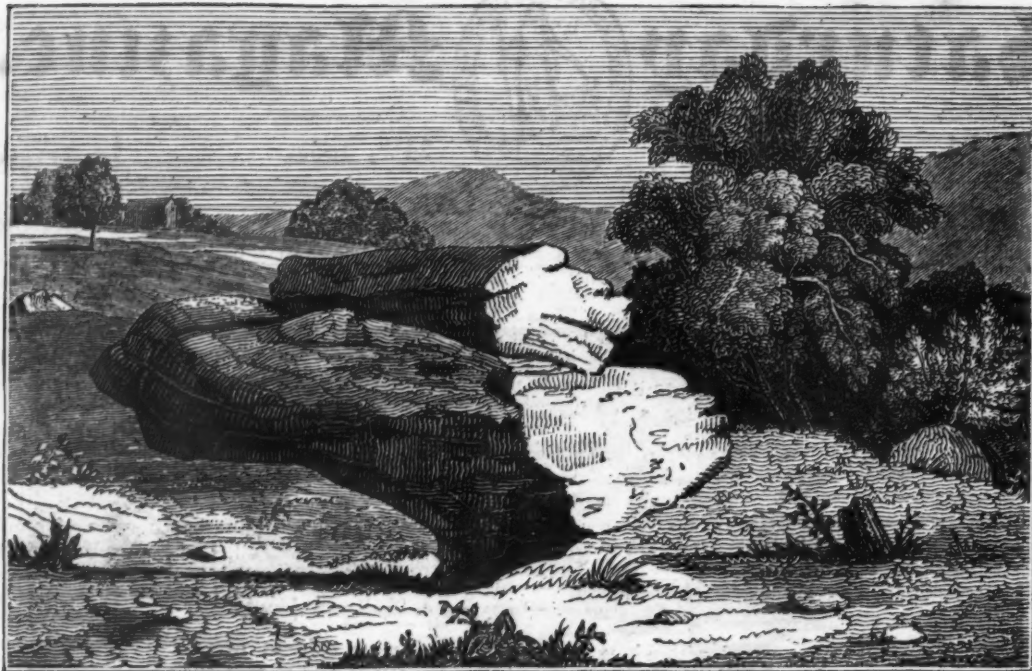
It may never fall within the compass of human knowledge, to understand, and to explain, *all* the conditions that are essential to the successive interchanges of which matter is susceptible; but we think it will not be denied, that heat is the primary and the most efficient agent in determining the greater part of the phenomena with which, at present, we are acquainted. Further, it may be remarked, that, in some of the instances referred to in the present paper, it is manifest that heat, which in one case evades our most diligent search by becoming *latent*, that is, concealed in any particular body, may, by a slight modification of circumstances, be drawn, so to speak, from its hiding-place, and rendered *sensible* or free.

Solid bodies have their melting-points altered by being mixed with others of a different kind, whether solid or fluid. Mercury is frequently adulterated by lead, tin, and other cheap metals. Now, as mercury is a fluid metal at ordinary temperatures, we have here an instance of another metal (lead) whose melting-point, when unalloyed, is 606° , becoming permanently fluid by being combined with mercury in certain proportions. Two parts, of lead and one part of tin, when combined, will melt at 385° , which is 57° below the melting point of tin, and 221° below that of lead, when each of these metals are in a state of purity. This mixture constitutes the solder used by plumbers. An alloy of three parts lead, two of tin, and five of bismuth, melts at 197° , which is 15° below the temperature of boiling water. Spoons are made of these combined metals, which melt on being placed in tea, or any other liquid, at the temperature already mentioned. R. R.

Y MAEN CHWYF, OR ROCKING STONE, IN THE VALE OF TAFF, GLAMORGANSHIRE.

The stone here represented, known in Welsh as, *Y Maen Chwyf*, (the Rocking Stone,) is situated on the western brink of a hill, called Coed-pen-maen, in the parish of Eglwysilan, Glamorganshire, above the turnpike-road from Merthyr to Cardiff, and nearly equidistant from both towns. From this spot may be seen the celebrated one-arched bridge over the Taff, near Newbridge, and fine views of several ramifications of the neighbouring hills and valleys. The romantic vale of Rhondda extends to the west, and a little nearer we have the salmon-leap, and fall of the Taff under Craig-yr-hesg; to the north-west, the equally beautiful vale of Cynon meets the eye.

* In chemical language, a *saturated solution*: that is, the boiling water is filled with the salt; it will dissolve no more of it



ROCKING STONE IN THE VALE OF TAFF, GLAMORGANSHIRE.

and the rugged chain of mountains which divide that valley from the upper portion of the vale of Taff, and from the parish of Merthyr-Tydvil, the great metropolis of British iron-works. To the south-east, the woods which fringe the Taff in its course towards Cardiff, add to the varied beauty of the scene; nor is it quite uninteresting to the tourist to learn, that just at the foot of the abrupt declivity of this hill, he will be well accommodated at the Bridge-water Arms, a comfortable Inn, situated in the midst of most enchanting scenery.

The name of the hill, *Coed-pen-maen*, (viz. the Wood of the Stone Summit,) is, doubtless, derived from this stone, which, in primitive ages, under the Druidic theology, was venerated as the sacred altar on which the Druids offered, "in the face of the sun, and in the eye of light," their orisons to the Great Creator.

The ground immediately around the stone is at present a bare sheep-walk, but the higher ground to the east is still covered with wood. The superficial contents of this stone are about 100 square feet, its thickness varying from two to three feet; it contains about 250 cubic feet. It is a sort of rough argillaceous sand-stone, which generally accompanies the coal-measures of this part of the country. A moderate application of strength will give it considerable motion, which may be easily continued with one hand. The under-side slopes around towards the centre, or pivot, and it stands nearly in equilibrium on a rock beneath, the circumstance which imparts to it its facility of motion.

The prevalent opinion of the surrounding inhabitants respecting this ancient stone is, that the Druids imposed on the credulity of the country by pretending to work miracles from it, and that they offered human sacrifices thereon; vulgar errors that are not sustained by the most distant allusion of the primitive British bards and historians.

The *Maen-Chwyf* (Rocking-Stone,) is rarely mentioned by ancient Welsh authors, but the *Maen-Llog** (Stone of Benefit), and *Maen-Gorsedd* (Stone of

the Supreme Seat,) &c., frequently occur. These were the central stones, encompassed by circles of stones at various distances, that constituted the Druidic temples, where worship in the face of the Sun was solemnized, institutional instruction imparted, and bardic graduations and inaugurations solemnized. That the *Maen-chwyf* and *Cromlech*, such as Kit's Coity House, near Aylesford, &c., were used for such central seats, cannot be reasonably doubted.

Several Bardic congresses have recently been held at this stone. The late distinguished Druid-Bard, and profound Welsh antiquary, Iolo-Morganwg, (Edward Williams, of Glamorganshire,) presided there in 1815, at the conclusion of the late war, and once or twice subsequently.

The last *Gorsedd* held there took place on Monday, September 22, 1834, (the 21st, the exact time of the autumnal equinox, and one of the four annual bardic festivals, having fallen on a Sunday. This *Gorsedd* would have taken place at the period of the Grand Royal Eisteddfod, held the preceding month at Cardiff, but that the indispensable notice of a year and a day had not expired from its first announcement. At this *Gorsedd*, Taliesin ab Iolo Morganwg, (son of the above-named Iolo Morganwg,) who gained the chair-medal at that Eisteddfod, as well as the beautiful medal given by the Princess Victoria and the Duchess of Kent, presided, having opened it with the very ancient Welsh proclamation usual on such occasions. At the close of this *Gorsedd*, the assembly adjourned to the house of Gwilym Morganwg, (Thomas Williams,) this person, and Taliesin Williams, (Ab Iolo,) are the only two Welsh bards regularly initiated into the arcana of Druidism now existing, at Newbridge, where an Eisteddfod was held, to adjudicate the prize for the best Welsh Ode in honour of the Rev. William Bruce, Knight, Chancellor of the Diocese of Llandaff, and Senior Judge of the Cardiff Eisteddfod.

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* From this British word *Llog* is derived the term *Logging* stone, given to the same description of piled stone in Cornwall.